

## CLAIMS

1. A copper alloy material for parts of electronic and electric machinery and tools, comprising 1.0 to 3.0% by mass of Ni, 0.2 to 0.7% by mass of Si, 0.01 to 0.2% by mass of Mg, 0.05 to 1.5% by mass of Sn, 0.2 to 1.5% by mass of Zn, and less than 0.005% by mass (including 0% by mass) of S, with the balance being Cu and inevitable impurities,
- 10 wherein a crystal grain diameter is more than 0.001 mm and 0.025 mm or less; and the ratio (a/b), between a longer diameter *a* of a crystal grain on a cross section parallel to a direction of final plastic working, and a longer diameter *b* of a crystal grain on a cross section
- 15 perpendicular to the direction of final plastic working, is 1.5 or less.

2. A copper alloy material for parts of electronic and electric machinery and tools, comprising 1.0 to 3.0% by mass of Ni, 0.2 to 0.7% by mass of Si, 0.01 to 0.2% by mass of Mg, 0.05 to 1.5% by mass of Sn, 0.2 to 1.5% by mass of Zn, 0.005 to 2.0% by mass in a total amount of at least one selected from the group consisting of Ag, Co and Cr (with the proviso that the Cr content is 0.2% by mass
- 25 or less), and less than 0.005% by mass (including 0% by

mass) of S, with the balance being Cu and inevitable impurities,

wherein a crystal grain diameter is more than 0.001 mm and 0.025 mm or less; and the ratio (a/b), between a longer diameter a of a crystal grain on a cross section parallel to a direction of final plastic working, and a longer diameter b of a crystal grain on a cross section perpendicular to the direction of final plastic working, is 1.5 or less.

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3. A copper alloy material for parts of electronic and electric machinery and tools, comprising 1.0 to 3.0% by mass of Ni, 0.2 to 0.7% by mass of Si, 0.01 to 0.2% by mass of Mg, 0.05 to 1.5% by mass of Sn, 0.2 to 1.5% by mass of Zn, and less than 0.005% by mass (including 0% by mass) of S, with the balance being Cu and inevitable impurities,

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wherein a surface roughness Ra after final plastic working is more than 0  $\mu\text{m}$  and less than 0.1  $\mu\text{m}$ , or a surface

20 roughness Rmax is more than 0  $\mu\text{m}$  and less than 2.0  $\mu\text{m}$ .

4. The copper alloy material for parts of electronic and electric machinery and tools according to Claim 3, wherein the copper alloy material for parts of electronic and electric machinery and tools is being

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plated with Sn or a Sn alloy.

5. The copper alloy material for parts of electronic and electric machinery and tools according to Claim 3, wherein the copper alloy material for parts of electronic and electric machinery and tools is being plated with Sn or a Sn alloy, and is being subjected to a reflow treatment.

10 6. The copper alloy material for parts of electronic and electric machinery and tools according to Claim 3, wherein the copper alloy material for parts of electronic and electric machinery and tools is being plated with Cu or a Cu alloy as an underlayer, and is  
15 being plated with Sn or a Sn alloy thereon.

7. The copper alloy material for parts of electronic and electric machinery and tools according to Claim 3, wherein the copper alloy material for parts of  
20 electronic and electric machinery and tools is being plated with Cu or a Cu alloy as an underlayer, and is being plated with Sn or a Sn alloy thereon, and is being subjected to a reflow treatment.

25 8. The copper alloy material for parts of

electronic and electric machinery and tools according to  
Claim 3, wherein the copper alloy material for parts of  
electronic and electric machinery and tools is being  
plated with Ni or a Ni alloy as an underlayer, and is  
5 being plated with Au or a Au alloy thereon.

9. A copper alloy material for parts of electronic  
and electric machinery and tools, comprising 1.0 to 3.0%  
by mass of Ni, 0.2 to 0.7% by mass of Si, 0.01 to 0.2% by  
10 mass of Mg, 0.05 to 1.5% by mass of Sn, 0.2 to 1.5% by  
mass of Zn, 0.005 to 2.0% by mass in a total amount of at  
least one selected from the group consisting of Ag, Co and  
Cr (with the proviso that the Cr content is 0.2% by mass  
or less), and less than 0.005% by mass (including 0% by  
15 mass) of S, with the balance being Cu and inevitable  
impurities,  
wherein a surface roughness Ra after final plastic working  
is more than 0  $\mu\text{m}$  and less than 0.1  $\mu\text{m}$ , or a surface  
roughness Rmax is more than 0  $\mu\text{m}$  and less than 2.0  $\mu\text{m}$ .

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10. The copper alloy material for parts of  
electronic and electric machinery and tools according to  
Claim 9, wherein the copper alloy material for parts of  
electronic and electric machinery and tools is being  
25 plated with Sn or a Sn alloy.

11. The copper alloy material for parts of  
 electronic and electric machinery and tools according to  
 Claim 9, wherein the copper alloy material for parts of  
 5 electronic and electric machinery and tools is being  
 plated with Sn or a Sn alloy, and is being subjected to a  
 reflow treatment.

12. The copper alloy material for parts of  
 10 electronic and electric machinery and tools according to  
 Claim 9, wherein the copper alloy material for parts of  
 electronic and electric machinery and tools is being  
 plated with Cu or a Cu alloy as an underlayer, and is  
 being plated with Sn or a Sn alloy thereon.

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 13. The copper alloy material for parts of  
 electronic and electric machinery and tools according to  
 Claim 9, wherein the copper alloy material for parts of  
 electronic and electric machinery and tools is being  
 20 plated with Cu or a Cu alloy as an underlayer, and is  
 being plated with Sn or a Sn alloy thereon, and is being  
 subjected to a reflow treatment.

14. The copper alloy material for parts of  
 25 electronic and electric machinery and tools according to

Claim 9, wherein the copper alloy material for parts of electronic and electric machinery and tools is being plated with Ni or a Ni alloy as an underlayer, and is being plated with Au or a Au alloy thereon.

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